

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY

AHRQ CQuIPS, MPSMS and QSRS, and Measuring Adverse Drug Events

Presentation for Interoperability Standards Priorities Task Force (ISPTF)

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AHRQ and CQuIPS

- AHRQ is the lead Federal Agency for patient safety
- Most of AHRQ's patient safety work is housed in the Center for Quality Improvement and Patient Safety
- Five Divisions – including three patient safety
  - Patient Safety Division
  - Healthcare-Associated Infections Division
  - Patient Safety Organizations (PSOs) Division
  - National Healthcare Quality and Disparities Report Division
  - CAHPS and SOPS Division

Patient Safety Surveillance

- AHRQ/CMS partnership to estimate annual national hospital-acquired condition rates

https://www.ahrq.gov/professionals/quality-patient-safety/pfp/index.html

- Rates calculated based on human medical record abstraction
- MPSMS to QSRS
- Exploring feasibility of automating abstraction from EHR

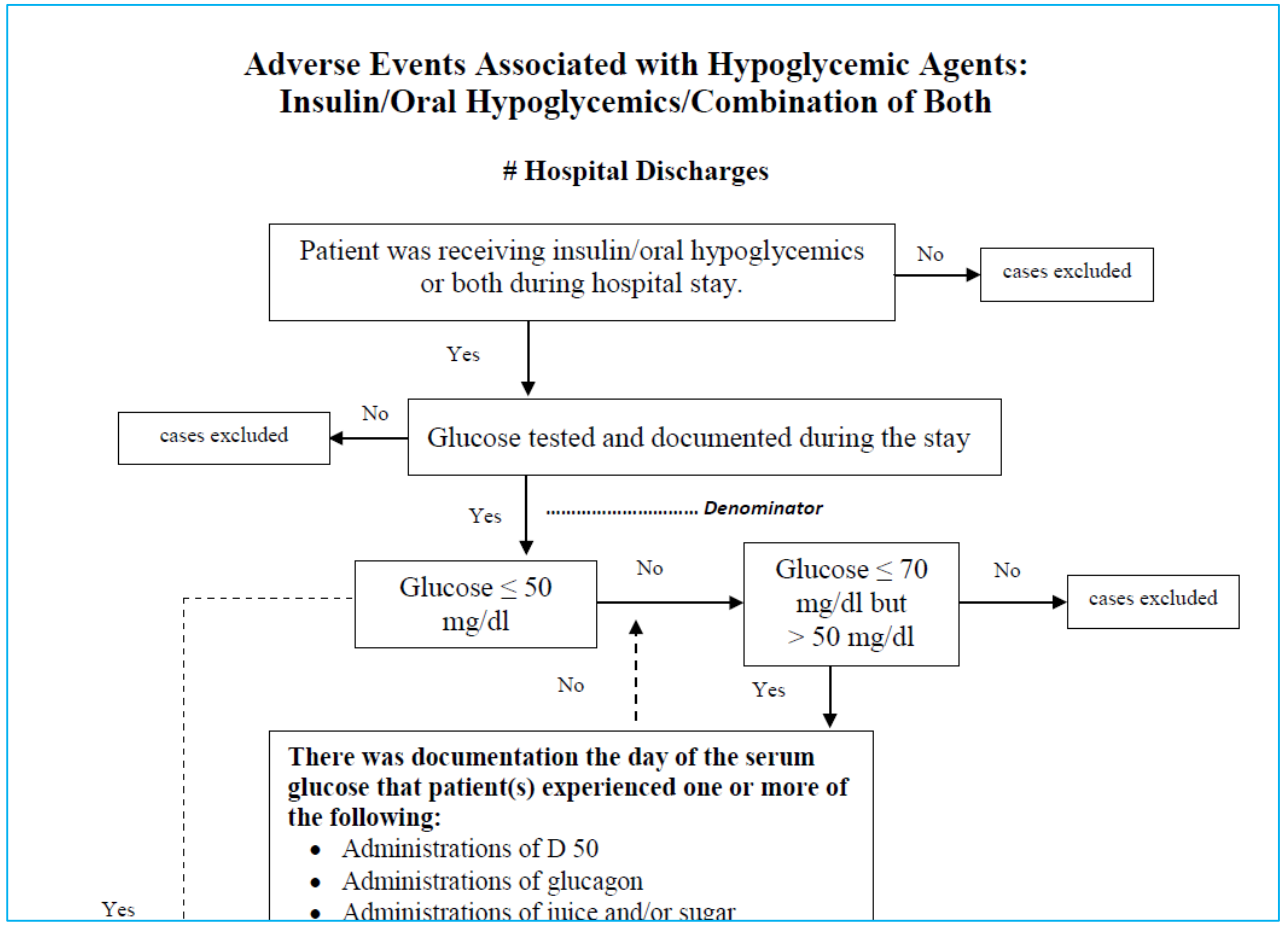
https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/qsrs/qsrs-final-report-feasibility-508.pdf

- Proof-of-concept for eAbstraction of one module

Current Clinovations Project on Hospital-acquired *C. diff* Infections

- Hospital-acquired *C. diff* infections module selected for proof-of-concept
- e-specified the module using eCQM model (VSAC, QDM, CQL, HQMF, etc.)
- Time-consuming, had to create new value sets

One MPSMS Adverse Drug Event (ADE) Excerpt



MPSMS measures have been producing data using consistent definitions since 2005. Last data year for MPSMS will be 2019

Some MPSMS ADE Data

Table 1. Adverse Events from 2005–2006 to 2010–2011.*

Event	Acute Myocardial Infa	
	2005–2006	2007 and 2009†
		number of
Adverse drug events		
Events associated with digoxin	0/85	2/124 (1.6)
Events associated with hypoglycemic agents	72/550 (13.1)	100/866 (11.5)
Events associated with IV heparin	96/540 (17.8)	78/625 (12.5)
Events associated with LMW heparin and factor Xa inhibitor	47/566 (8.3)	54/962 (5.6)
Events associated with warfarin	12/150 (8.0)	16/231 (6.9)

In Table 1 in:
https://www.nejm.org/doi/full/10.1056/NEJMsa1300991

Exhibit A2c. All 2014, 2015, 2016, and 2017 (preliminary) HACs (not rounded)

HAC Type	Source	Measure	Total 2014 HACs	Total 2014 HAC Rate per 1,000 Discharges	Total 2015 HACs Normalized to 2014 Baseline	To H. No t B
Adverse Drug Event	MPSMS	ADE Associated With Digoxin	6,204	0.21	795	
	MPSMS	ADE Associated With Hypoglycemic Agents	517,177	17.38	549,638	
	MPSMS	ADE Associated With IV Heparin	141,711	4.76	81,362	
	MPSMS	ADE Associated With LMWH and Factor Xa Inhibitor	247,441	8.32	159,633	
	MPSMS	ADE Associated With Warfarin	88,814	2.99	102,338	
	MPSMS	**Total ADE (sum of 5 above)**	1,001,348	33.66	893,766	

On page 21 in:
https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/pfp/hacreport-2019.pdf

AHRQ "Common Formats – Surveillance"
(11 Modules in QSRS Software – Successor to MPSMS)

• Birth – Maternal / Neonatal	• Medication
• Blood	• Other Outcomes of Interest
• Device	• Pressure Ulcer / Pressure Injury
• Fall	• Surgery or Anesthesia
• Generic	• Venous Thromboembolism (VTE)
• Healthcare Associated Infection - Catheter Associated Tract Infection (CAUTI) / Clostridium Difficile Infection (CDI) / Central Line Associated Blood Stream Infection (CLABSI)/ Pneumonia / Surgical Site Infection (SSI) / Urinary Tract Infection (UTI)	

QSRS Medication Module

QSRS Medication Module Adverse Drug Events include:

1. Adverse Drug Reactions: Suspected Allergic Reactions and Overdoses
2. **Anticoagulant Adverse Events**
   (3 types that are associated with both older medications and newer medications)
3. **Hypoglycemic Adverse Events**
4. **Opioid Adverse Events**
5. Other ADEs
   - option for unprompted free text inputs not captured above, e.g., GI bleeds from NSAIDs, delirium associated with benzodiazepines, etc.

Anticoagulant Adverse Event
(1 type below)

if → **a. Patient received Warfarin and a conspicuous lab result occurred <u>or</u> a conspicuous physician response indicative of a problem occurred.**

and then → **b. Clinically significant finding in patient occurred that is likely due to (a)** → = ADE

1.2.1.2 Patient receiving warfarin during hospital stay and **both** of the following:

- 1.2.1.2.1 **Either** of the following lab values or actions:
  - 1.2.1.2.1.1 INR greater than 5.0
  - 1.2.1.2.1.2 Administration of **any** of the following:
    - 1.2.1.2.1.2.1 Vitamin K
    - 1.2.1.2.1.2.2 Fresh frozen plasma
    - 1.2.1.2.1.2.3 Prothrombin complex concentrate
    - 1.2.1.2.1.2.4 Recombinant factor VIIa
    - 1.2.1.2.1.2.5 Blood or red cell transfusion and no surgical operation

1.2.1.2.2 **Any** of the following adverse outcomes more than 24 hours after admission and within 1 day, either before or after, **any** of the circumstances listed above in 1.2.1.2.1:

- 1.2.1.2.2.1 Hemoglobin decrease of ≥ 5 mg/dL or a ≥ 15% absolute decrease in the hematocrit following anticoagulant administration, if more than 48 hours after admission
- 1.2.1.2.2.2 Bleeding not present on admission
  - 1.2.1.2.2.2.1 Gastrointestinal bleeding
  - 1.2.1.2.2.2.2 Genitourinary bleeding
  - 1.2.1.2.2.2.3 Pulmonary bleeding
  - 1.2.1.2.2.2.4 Hematoma
  - 1.2.1.2.2.2.5 Intracranial bleeding (e.g., subdural hematoma
  - 1.2.1.2.2.2.6 Other types of bleeding
- 1.2.1.2.2.3 Cardiac arrest/emergency measures to sustain life/call for rapid response team
- 1.2.1.2.2.4 Death

Paper based on a study of data from this measure available at:
https://www.journalofhospitalmedicine.com/jhospmed/article/127055/warfarin-associated-adverse-events

Hypoglycemic Adverse Event

Any blood glucose <50 after insulin…

1.2.2.1 Patient receiving insulin **and/or** other hypoglycemic agent (e.g., exanatide, glyburide, glucophage) during hospital stay and blood glucose documented as ≤ 50 mg/dL more than 24 hours after admission, including whether **any** of the following adverse outcomes occurred on the same day as the low blood glucose:

- 1.2.2.1.1 Profuse sweating
- 1.2.2.1.2 Confusion
- 1.2.2.1.3 Seizure
- 1.2.2.1.4 Coma or loss of consciousness
- 1.2.2.1.5 Cardiac arrest/emergency measures to sustain life/call for rapid response team
- 1.2.2.1.6 Death

and …some blood glucoses <70 after insulin.

1.2.2.2 Patient receiving insulin and/or other hypoglycemic agent (e.g., exanatide, glyburide, glucophage) during hospital stay and blood glucose documented as > 50 and ≤ 70 mg/dL, and being administered D50, D10, or glucagon more than 24 hours after admission, including whether any of the following adverse outcomes occurred on the same day as the low blood glucose:

- 1.2.2.2.1 Profuse sweating
- 1.2.2.2.2 Confusion
- 1.2.2.2.3 Seizure
- 1.2.2.2.4 Coma or loss of consciousness
- 1.2.2.2.5 Cardiac arrest/emergency measures to sustain life/call for rapid response team
- 1.2.2.2.6 Death

Opioid Adverse Event

(ADE based on 3 ways to identify & 7 ways to exclude those provisionally identified)

Patient receiving opioids (e.g., morphine, fentanyl, meperidine, etc.) during hospital stay and experiencing any of the following within 24 hours of opioid administration:

1. Administration of intravenous (IV) naloxone, unless:
   - » IV naloxone was administered during a procedure or within 2 hours following a procedure, or
   - » IV naloxone was administered for pruritis, urinary retention, or constipation, or
   - » IV naloxone was administered only in combination with, or at the same time as, the opioid
2. Respiratory arrest, unless:
   - » The respiratory arrest was described as due to the patient's underlying condition or diagnosis, or
   - » The respiratory arrest was described as anticipated or normal, or responded to as if it had been anticipated by the hospital's clinical personnel, based on the opioid dosage
3. Unresponsiveness or response only to noxious stimulation, unless:
   - » The unresponsiveness was described as due to the patient's underlying condition or diagnosis, or
   - » The unresponsiveness was described as anticipated or normal, or responded to as if it had been anticipated by the hospital's clinical personnel, based on the opioid dosage

Questions?

- Contact information
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Additional Information

Key Points from Automation Feasibility Study re: Medications Module

- Analyzed QSRS questions and grouped them into five categories re: how information is stored in the EHR
  - Numeric Value
  - Structured and Coded
  - Structured and Uncoded
  - Structured Free Text
  - Unstructured Free Text
- Medications Module had 64 questions
  - 3 numeric value, 14 structured and coded, 15 structured and uncoded, 10 structured free text, 22 unstructured free text

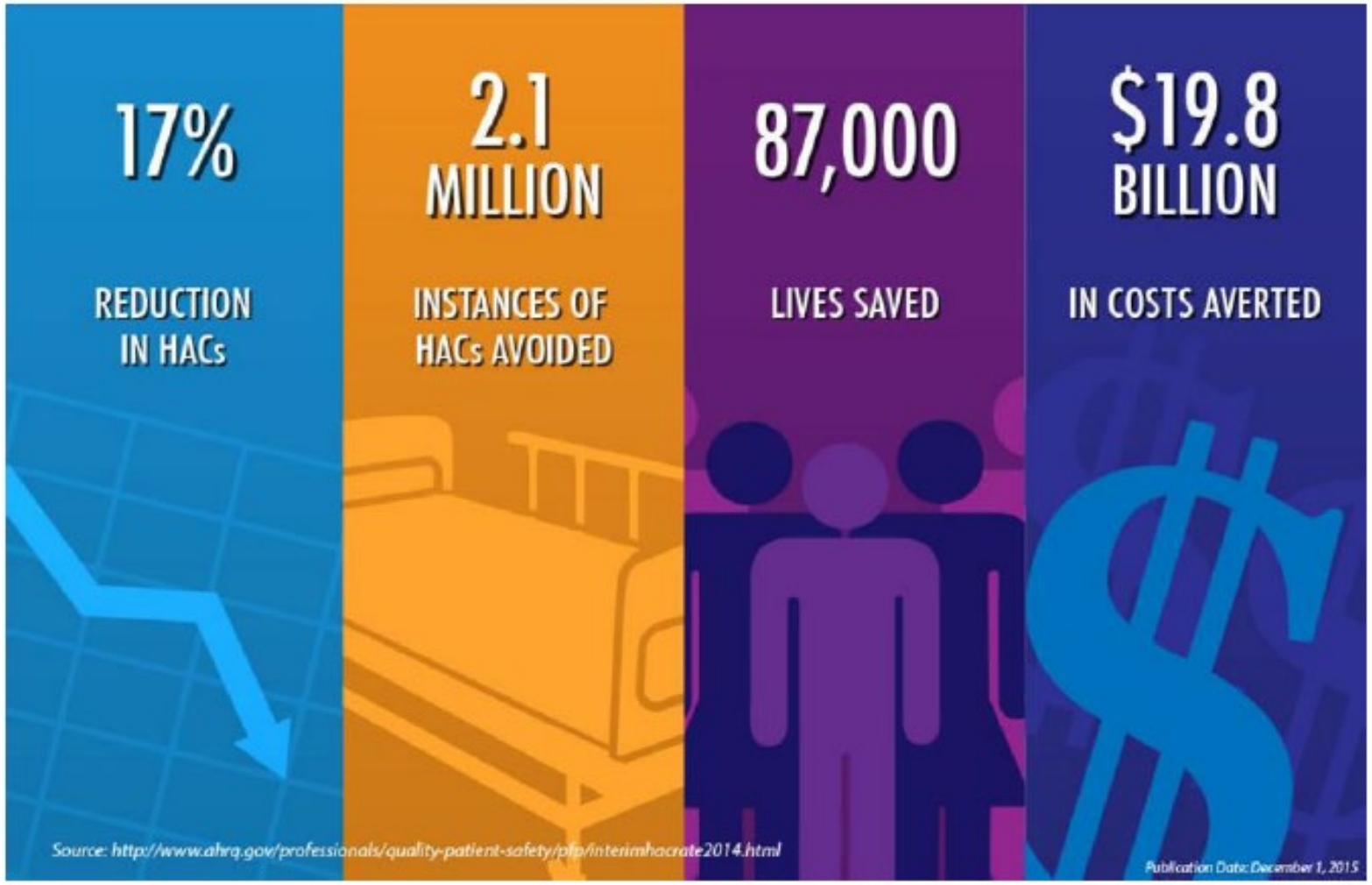
From “Feasibility of the Partial Automation of Data Abstraction for the Quality and Safety Review System” pages 37 and 38.
https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/qsrs/qsrs-final-report-feasibility-508.pdf

Summary Comparisons: 2010 baseline to Final 2013 and 2014 Estimates

HAC Type	Total Change in HACs, 2010 to 2013	Total Change in HACs, 2010 to 2014	Change in HAC-related deaths, 2010 to 2013	Change in HAC-related deaths, 2010 to 2014	Change in HAC-related hospital costs, 2010 to 2013	Change in HAC-related hospital costs, 2010 to 2014
Adverse Drug Events	577,000	838,000	11,540	16,760	$2,885,000,000	$4,190,000,000
CAUTIs	190,000	340,000	4,427	7,922	$190,000,000	$340,000,000
CLABSIs	10,800	23,800	1,998	4,403	$183,600,000	$404,600,000
Falls	50,000	50,000	2,750	2,750	$361,700,000	$361,700,000
Obstetric Adverse Events*	10,000	15,000	15	22	$30,000,000	$45,000,000
Pressure Ulcers	280,000	590,000	20,272	42,716	$4,760,000,000	$10,030,000,000
Surgical Site Infections*	45,000	62,000	1,269	1,748	$945,000,000	$1,302,000,000
Ventilator-Associated Pneumonias	8,000	8,000	1,150	1,150	$168,000,000	$168,000,000
(Post-op) Venous Thromboembolisms	5,000	17,000	520	1,768	$40,000,000	$136,000,000
All Other HACs**	142,000	164,000	6,433	7,429	$2,414,000,000	$2,788,000,000
Totals	**1,317,800**	**2,107,800**	**50,374**	**86,669**	**$11,977,300,000**	**$19,765,300,000**

* Final 2013 rates from NHSN and PSIs (not shown in MPSMS-based quarterly data) used for Interim 2014 rates
** Interim 2014 rate is from a combination of Interim 2014 (MPSMS) and Final 2013 (PSI) data

AHRQ Infographic with Same Data



Trend for 2014-2017 (Preliminary): 13% Reduction in HACs